January 5, 1962

Dr. William L. Brown
Department of Plant Breeding
Pioneer Hi-Bred Corn Company
Johnston, Iowa

Dear Bill:

Enclosed is a copy of the outline prepared by Wellhausen that I mentioned to you on the phone. Wellhausen hopes to initiate, by the outlined means, a program of advanced training that will eventually be conducted in the mentioned Latin American centers. I am in sympathy with the objective but have doubts of the effectiveness of this means of obtaining it. We can only hope that some of our enthusiasm for the race studies may be contagious regardless of circumstances.

I have made a list of possible projects that may be considered for Kato, Blumenschein, and Safont. It may be assumed, I believe, that Kato would continue maize investigations after completing the Ph.D. degree at North Carolina. A long-term project associated with maize improvement could be considered for him. Blumenschein, on the other hand, may not continue with maize after returning to Brazil. A project of general botanical interest might be considered for him, such as an extension of the race investigations with emphasis on origins, migrations and introductions. This would involve a sampling of collections of races from those geographic areas that we would consider important for increasing our understanding of this topic. Such a study would not require progeny tests and the project could be terminated at any time. Something would be gained from it and Blumenschein would not need to feel the pressure of the breeding program. As for Safont, he remains a blank. I know nothing of his interests or what may be expected of him in the future. We could consider starting several different types of projects and then allow him to select the one that would best fit his interests.

I had hoped that the Fellows would be brought to North Carolina in September rather than June in order that each could become oriented in the North American educational system and could have an opportunity to improve in comprehension of English. To attempt a research project almost immediately after arriving in this country could be a strain, and I suspect that this will be the case. In talking with Wellhausen and with Robinson, however, I received the impression that the Fellows were expected to commence a project this coming summer. Under such circumstances we will need to make outlines for these projects that can be followed rather blindly in the initial steps.

On the enclosed sheets, I have listed a number of topics that we might consider for these Fellows. Undoubtedly, you will have additions and

amendments to this list. The task of preparing for the projects could be relatively easy or it could be difficult depending on the selections that we may make. I will contact you by phone later. It may be possible for us to select at that time some of the projects that could be started. If, for any reason, you would consider it advisable for me to discuss details with you in advance of the Raleigh meeting, I would be willing, of course, to come to Iowa for this purpose.

Sincerely,

Barbara McClintock

BM:b
Enc.

GENERAL TOPICS

I. The Centers of Origin of Cultivated Maize

The premise that such centers exist is based on the assumption that the knobs are conservative and that they could reveal the constitutions of the original forms of cultivated maize. The evidence we now have supports this supposition, even though a few knob types may represent exceptions to this. A project to further our knowledge of the original types of cultivated maize and to learn of the location of each could be considered. This could include examination of plants derived from individual collections made in:

(a) geographic areas already examined and

(b) in geographic areas not yet examined.

With regard to (a) above, the areas needing further exploration are:

Bolivia: lowlands, north, east, and southeast.

Guatemala: highlands, southeast and northeast.

Venezuela: all areas.

Northwest Mexico and southwest U. S.

Eastern Mexico

Southeast U. S.

The West Indies

With regard to (b) above, we need all of Colombia, Brazil, Argentina, Uruguay, Paraguay and also southern Chile. Maize from Indian tribes in central and northeast U. S. should be examined--if seed is still available.

Our present knowledge suggests that some races may occupy key positions. They may represent more or less direct descendants of some of the original types of cultivated maize. These could be Enano in Bolivia, Salpor in Guatemala, and the Desconocidoes of Venezuela as well as Palomero and Cacahuacintle in Mexico, etc.

As I picture it now, centers of origin may be found in Peru-Bolivia, in

Guatemala highlands, and somewhere in the large area of Venezuela, Central America and Western Mexico.

With regard to projects for the Fellows, we might consider expanding our knowledge by sampling more collections from the areas that are expected to be centers of origin of cultivated maize. This could include the area of suspected origin of the Andean complex (north central Bolivia?), the Guatemala complex (central highlands), and any other area that you may consider to be a possibility in this regard. I know you have thoughts in this regard on some of the races in Brazil and possibly Paraguay and Argentina. Therefore, we might consider selections of races from particular areas for cytological examinations.

II. The Origin of Races from Mixing of Different Original Germplasms:

(a) following migration of germplasms and mixing at areas of contact, and

(b) consequent to introductions of foreign germplasms that occurred in pre-Colombian times.

For me, this is a particularly interesting component of the maize race study. Do you have any suggestions for further exploration of this topic? Are there some races in areas about which we already know something that you suspect to be the result of admixtures of indigenous and introduced maize? Could a sampling of a number of collections from one such area be made in order to determine this? I suspect that a sampling of collections made in southeast Guatemala and adjacent Honduras would reveal something of importance in this regard. Northeastern Bolivia might also give us some information, as well as selections from southeastern Bolivia. A project that considers this objective could be formulated.

III. A Maize Improvement Project

This project we discussed in some detail when you were here in July. It has many facets which I will not attempt to enumerate here. It is one that

will require considerable thought in advance of selection of materials. Also, the manner of conducting the experiments needs to be considered carefully. My lack of knowledge of breeding procedures and modes of evaluating results is so serious that I am lost in trying to consider the ways and means for this project that would be accepted by maize breeders. Since this is an important aspect of the maize program, it will need to be considered with some care. I think we need to consider the following:

The races that should be selected for crossing.

The number of such races that should be crossed initially.

The types of results that Wellhausen et al. have already obtained from crosses of the selected races.

The inbreeding of selected races:

(a) those expected to remain unaltered by inbreeding (or nearly so).

(b) those expected to break-up through inbreeding.

(c) the results already obtained by Wellhausen et al. in this regard.

The mode of evaluating the results obtained from crossing.

The selections in F_1 and in F_2 and the cytological examinations that should be made.

The list of possible crosses that I made when you were here runs like this:

Cacahuacintle x Veneguela Desconocidoes

Salpor x Zapalote Chico

Cacahuacintle x Zapalote chico

Western Mexico x Northeast U. S.

Anean x Northeastern U. S.

Salpor x Northeastern U. S.

Coastal x Andean (Highland x Lowland)

Palomero Toluqueño x Coroico

Harinoso de Ocho x Northeastern U. S.

This list is too tentative and should be reconsidered.

IV. Incidental projects:

Examination of the Nal-Tel complex.

Knob constitutions in wild populations of Tripsacum

Use of abnormal chromosome 10 in effecting rapid consolidation of parental types following crosses of "no knob" races with "many knob" races.

We might consider the manner in which abnormal chromosome 10 could be used in breeding projects.

Others that you may suggest under this heading.